: HIGH AFT X-TUBE 412

Date:

Monday, 1/30/2006 8:07:47 AM

User:

Kim Johnston

**Process Sheet** 

Customer

: CU-DAR001 Dart Helicopters Services

**Job Number** 

: 25651

**Estimate Number** 

: 10559

P.O. Number

: NA

: 1/30/2006 This Issue Prsht Rev.

: NC NIA

: 25650

S.O. No. : N/A

: LANDING GEAR Type

**Part Number** 

**Due Date** 

**Drawing Name** 

: D412664203 - D412-664-243 REV B **Drawing Number** 

Project Number **Drawing Revision** 

Material

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Written By

First Issue

**Previous Run** 

Checked & Approved By

Comment

**Additional Product** 

Job Number:



Seq. #:

1.0

Machine Or Operation:

Description:

DOCUMENT CONTROL

Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP₄D412-664-203 CHG 003

D H

06/03/

2.0

D6009129

Crosstube Material



Comment: Qty.:

1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6009-129 Crosstube <u>B21024</u>

Check OD = 3.500"; ID = 2.250"

M8

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166

MS 06/02/18

2-Turn first side as per Folio FA166

MS 06/02/19

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243.

4.0

QC1

INSPECT ALL DIM TO DIM SHEET

Comment: INSPECT ALL: DIM TO DIM SHEET

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Part No		PAR #:	Fault Cate	gory:	NCR: Yes	No DQA	۸:	Date:	
. 5					QA: N/	C Closed	l:	_ Date: _	<u> </u>
NCR:			WORK ORDI	ER NON-CONFORMAN	NCE (NCR	)		·	· .
DATE	STEP	Description of NC Section A	Initial Chief Eng	Corrective Action Section Action Description Chief Eng	B Sign & Date	Verific Section		Approval Chief Eng	Approval QC Inspector
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Monday, 1/30/2006 8:07:47 AM Date: มser: Kim Johnston **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 25651 Job Number: Seq. #: **Machine Or Operation:** Description: MORI SEIKI CNC LATHE LARGE MORI SEIKI 5.0 Comment: MORI SEIKI CNC LATHE LARGE MS 06/02/20 1-Turn second side as per Folio FA166 2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243. 

OGIONIO MS 06/02/20 3-Polish entire outside surface of crosstube MS 06/02/20 4- Remove sand and plugs 5-Scribe part # and batch # using vibrating stylus as per Dwg D412-664-243 INSPECT ALL DIM TO DIM SHEET 6.0 QC1 06/02/20 Comment: INSPECT ALL DIM TO DIM SHEET SECOND CHECK 7.0 QC8 Comment: SECOND CHECK 06.02.21 HAND FINISHING RESOURCE #1 8.0 HAND FINISHING1 Comment: HAND FINISHING RESOURCE #1 Chemical Conversion Coat as per QSI 005 4.1 INSPECT WORK/WING WALK 9.0 QC3/5 Comment: Inspect work & Chemical conversion Coat BENDING 10.0 Comment: BENDING MACHINE Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010 DIMENSIONAL CHECK 11.0 Comment: DIMENSIONAL CHECK Emsil

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DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng		Sign 8 Date	Section		Chief Eng	QC Inspector
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Monday, 1/30/2006 8:07:47 AM Date: User: Kim Johnston **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 25651 Job Number: Description: Seq. #: Machine Or Operation: LANDING GEAR RESOURCE 1 LANDING GEAR 1 12.0 Comment: LANDING GEAR RESOURCE 1 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 \ \hat{\lambda} \hat{\lambda} \hat{\lambda} \hat{\lambda} \forall \forall \lambda \hat{\lambda} \forall \forall \lambda \hat{\lambda} \forall \forall \lambda \hat{\lambda} \forall \forall \lambda \hat{\lambda} \forall \forall \forall \forall \hat{\lambda} \hat{\lambda} \hat{\lambda} \forall \forall \forall \forall \hat{\lambda} \forall \hat{\lambda} \forall \hat{\lambda} \forall \hat{\lambda} \forall \hat{\lambda} \forall \forall \hat{\lambda} \hat{\lambda} \forall \hat{\lambda} \f 2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551.Check Pm ( 04 - 03 - 080) dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes. 3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243 for C 0 6-05-08 () HAND FINISHING RESOURCE #1 13.0 HAND FINISHING ÷.,. Comment: HAND FINISHING RESOURCE #1  $\mathcal{T}$ SAD Chemical Conversion Coat as per QSI 005 4.1 06:03:08 **OUTSIDE SERVICES** 14.0 Comment: Sub-Contracting OUTSIDE SERVICES -06.03.09 Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 767 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order PACKAGING RESOURCE #1 PACKAGING 1 15.0 Comment: PACKAGING RESOURCE #1 Inspect for transit damage Ensure copy of NDT results attached to work order. DIMENSIONAL CHECK 16.0 QC6 Comment: Inspect for damage & ensure results are as per Dwg D412-664-203 17.0 SPRAY PAINTING Comment: SPRAY PAINTING FC 66 03 22 1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2

Form: rprocess

Page 3

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Monday, 1/30/2006 8:07:47 AM Date: User: Kim Johnston **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 25651 Job Number: Description: Seq. #: **Machine Or Operation:** Inspect Spray Paint QC14 18.0 Comment: Inspect Spray Paint Wrap in plastic bag to protect from scratches D2856600 Abrasion Strip 19.0 1.7640 f(s) Total: Comment: Qty.: 1.7640 f(s)/Unit Pick: Description Batch Qty Part number 🗲 D2856-600(Cut to 10.090") Abrasion Strip  $\, R_{\!\scriptscriptstyle }$ 20.0 1.0080 f(s) Comment: Qty.: 1.0080 f(s)/Unit Total: Pick: Qty Part number Description Batch 2 D2856-600(Cut to 10.870") Abrasion Strip 21.0 D28961 Support 1.0000 Each(s) Comment: Qty.: 1.0000 Each(s)/Unit Total: Pick: **Description Batch** Qty Part number Support /-D2896-1 22.0 D31891 Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s) Pick: Qty Part number **Description Batch** Chafing Sheild 2 D3189-1 23.0 MS2192028 Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s) Pick: Qty Part number **Description Batch** Clamp <u>H100479</u> 4 MS21920-28

W/O:		WORK ORDER CHANGES									
DATE STEP		PROCEDURE CHANGE	Ву	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector				
06-3-27	19	Only Require ()		e6-3-27		Cl	04.03.27				

Part No:	PAR #:	Fault Category:	NCR: Yes No DQA:	Date:
			QA: N/C Closed:	Date:

NCR:	WORK ORDER NON-CONFORMANCE (NCR)							
	T	Description of NC		Corrective Action Section E	}	Verification Section C		A
DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date		Approval Chief Eng	Approval QC Inspector
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Date: Monday, 1/30/2006 8:07:48 AM Kim Johnston User: **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Job Number: 25651 Part Number: D412664203 Job Number: Description: Seq. #: Machine Or Operation: Clamp 24.0 MS2192030 2.0000 Each(s) Comment: Qty.: 2.0000 Each(s)/Unit Total: Pick: Qty Part number Description Batch Clamp <u>H1592</u> 2 MS21920-30 25.0 Comment: INSPECT WORK TO CURRENT STEP PACKAGING RESOURCE #1 26.0 **PACKAGING 1** Comment: PACKAGING RESOURCE #1 Pick Packing Kit Bolt 27.0 Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s) Description Batch M18254 2MC4 M18 28.0 AN641A 2.0000 Each(s) Each(s)/Unit Total: AN960JD616 € Washer 29.0 18.0000 Each(s)/Unit Total: Comment: Qty : M/00035 30.0 Comment: Qty.: 6.0000 Each(s)/Unit Total: 6.0000 Each(s) 1 Description Batch Page 5

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DATE	STEP	Section A	Initial Chief Eng	Action Description Chief Eng	Sign & Date	Section C	Approval Chief Eng	Approval QC Inspector	

Monday, 1/30/2006 8:07:48 AM Date: User: Kim Johnston **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services **Part Number:** D412664203 Job Number: 25651 Job Number: Description: Seq. #: **Machine Or Operation:** INSPECT 100% KITS FOR COMPLETENESS QC4 31.0 Comment: INSPECT 100% KITS FOR COMPLETENESS PACKAGING RESOURCE #1 32.0 PACKAGING 1 Comment: PACKAGING RESOURCE #1 Identify and pack for shipping as per PPP D412-664-203 Location:\_ PPP Rev: DOCUMENT CONTROL 33.0 Comment: DOCUMENT CONTROL Inspection Level 21 U 06.03.26 Job Completion

W/O:		WORK ORDER CHANG	WORK ORDER CHANGES								
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DART AEROSPACE LTD	Work Order:	25651
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: B		Page 1 of 1

## FIRST ARTICLE INSPECTION CHECKLIST

X First Article Prototype

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
	2.684	+0.005/-0.000	2.686				
	2.748	+0.005/-0.000	2.751				
	2.884	+0.005/-0.000	2.887	~			
	3.019	+0.005/-0.000	3.021				
	3.163	+0.005/-0.000	3.167	/			
	3.308	+0.005/-0.000	3.310	/			
	3.429	+0.005/-0.000	3.431	V_			
¥ ₩	2.990	+0.005/-0.000	2.992				
SIDE	2.618	+0.005/-0.000	2.621	~			
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	0.200	+/-0.010	,200	<u></u>			
	R0.063	+/-0.010	,٥٥٦	/			
	R0.500	+/-0.010	,500				
	4.971	+/-0.001	4.980	/			
	2.684	+0.005/-0.000	2.687	<b>/</b>			
	2.748	+0.005/-0.000	2.752	<b>/</b>			
	2.884	+0.005/-0.000	2.887				
	3.019	+0.005/-0.000	3.023	<b>/</b>			
	3.163	+0.005/-0.000	3.167				
	3.308	+0.005/-0.000	3. 312				
	3.429	+0.005/-0.000	3,431				
Ш	2.990	+0.005/-0.000	2.992				
SIDE	2.618	+0.005/-0.000	2.620	<b>/</b>			
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	0.200	+/-0.010	· 200	<b>/</b>			
	R0.063	+/-0.010	E20.	/			
	R0.500	+/-0.010	·200	~			<u> </u>
	4.971	+/-0.001	4.980	<b>/</b>			*
	124.09	+/-0.020	124.09				

Measured by: NS	Audited by:	86 .	Prototype Approval:	N/A
Date: 06/02/18	Date:	06.07.21	Date:	N/A

Rev	Date	Change		Revised by	Approved
Α	04.06.16	New Issue	(P/O D412-664-203)	KJ/JLM	





DESIGN	ORAWN BY		DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA		
CHECKE		APPROVED	DRAWING NO. REV. B D412-664-243 SHEET 1 OF 3		
DATE 05.02	2.04	<u> </u>	TITLE SCALE CROSSTUBE ASSEMBLY (412 HI AFT) NTS		
A <sub>1</sub>		01.10.17	NEW ISSUE		
В		05.02.04	ADD HOLES FOR COMPATABILITY		

SHOP COPY

RETURN TO ENGINEERING UNCONTROLLED COPY

SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER



Qty	Part Number	Description
X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
1	D6009-129	CROSSTUBE
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
1	D2856-600-1087	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP
2	D3189-1	CHAFING SHIELD

#### **GENERAL NOTES:**

TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.

2) MATERIAL: MANUFACTURED FROM D6009-129

FINISHED LENGTH = 124.09±0.020

FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART 005 4.2

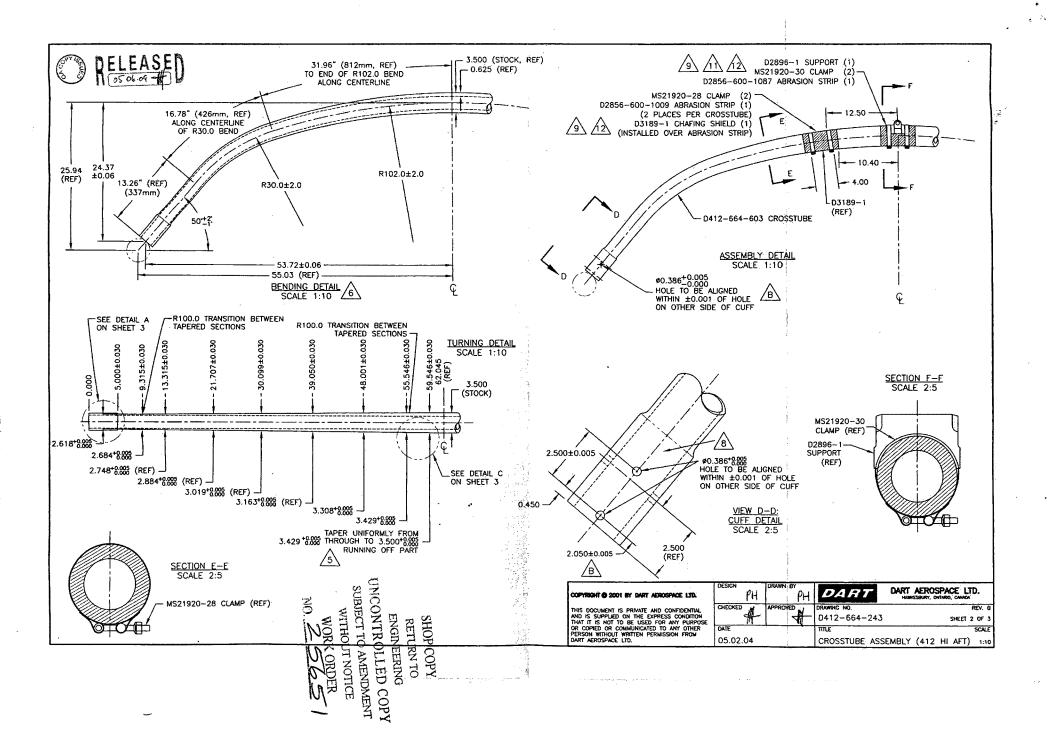
PART IS SYMMETRIC ABOUT CENTERLINE.

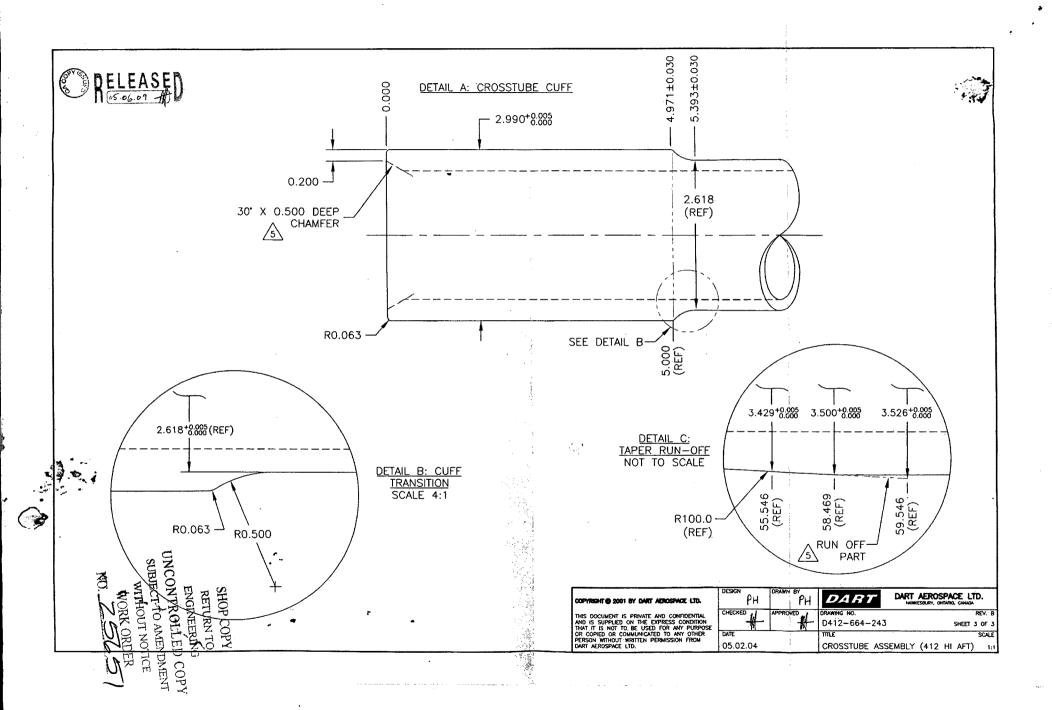
5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.

- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- INSTALL D2856-600-1009 AND D2856-600-1087 ABRASION STRIPS WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2896-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- IT IS OPTINAL TO TO SEAL EDGES OF SUPPORTS USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

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#### **Jason Murdoch**

From: David Shepherd [davids@dartaero.com]

Sent: March 8, 2006 2:41 PM

To: Jason Murdoch

Cc: Linda Lacelle; Bill Beckett; Dan Stow

Subject: Fw: x-tubes

After talking to Dan, I have re-considered and I think we can accept D412-664-203 B24779, which has a spread of 106.84 instead of 107.44, but this is really pushing the limits in my opinion. It is 0.48" out of tolerance. D412-664-203 B25653 is 0.70" out of tolerance. This is not acceptable. While it could be done, I don't like the idea of overloading this tube to spread it back out.

David

---- Original Message ---From: David Shepherd
To: Jason Murdoch
Cc: Linda Lacelle

Sent: Tuesday, March 07, 2006 2:53 PM

Subject: Fw: x-tubes

Jason,

D412-664-203 B25653 & B24779 are NOT ACCEPTABLE (under 107.0")

D212-664-201 B24786 & D412-664-203 B24778, B24778, and B25651 are ACCEPTABLE.

Why do 2 tubes have the same B/N??? Please investigate.

David

---- Original Message ---- From: Jason Murdoch
To: davids@dartaero.com

Cc: Linda lacelle

Sent: Tuesday, March 07, 2006 8:07 AM

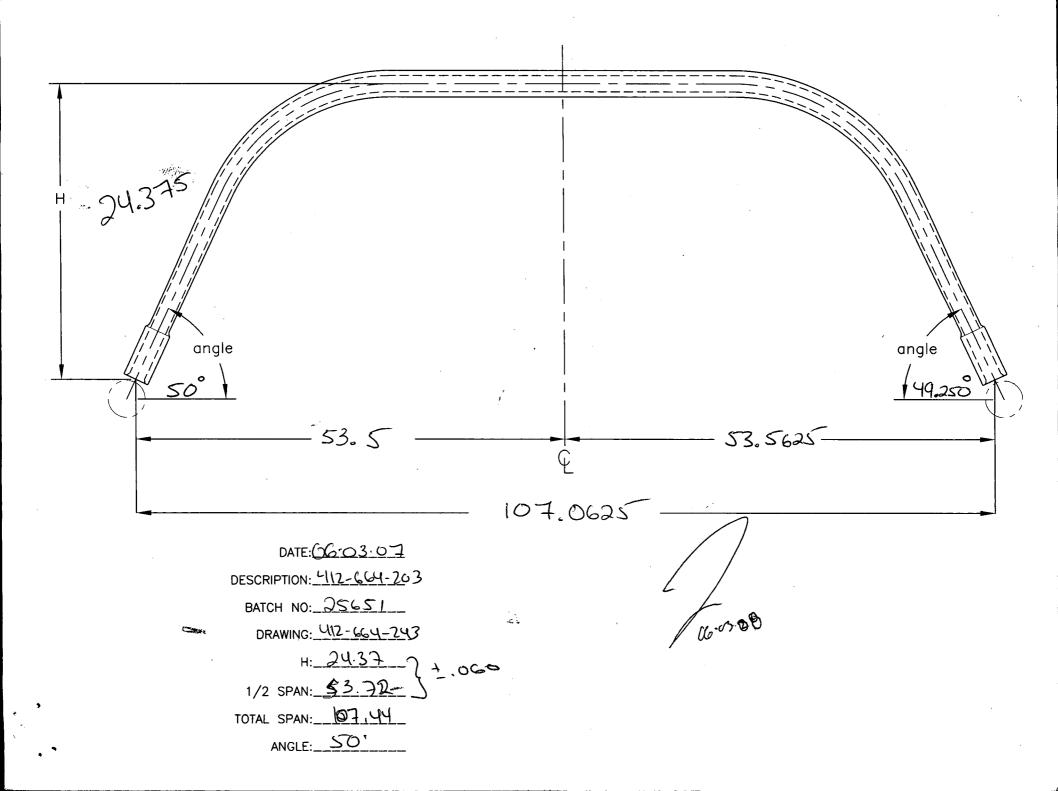
Subject: x-tubes

Good day

I have some tubes that are over bent. I think the problem was when the centers were bent too much, because the angles are perfect on the ends. What do think of the attached sheets?

jmurdoch@dartaero.com

Q.C.Inspector





 $N_{\bar{0}}$ 33712 W.O.

A.M.O. Number: 46/90

## **NON-DESTRUCTIVE TESTING REPORT**

A STATE OF THE PARTY OF THE PAR	Market Barrier William	THE PROPERTY AND ADDRESS OF THE PARTY AND ADDR		and the same of	the second second
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REGISTRATION:	MODEL/TYPE:		SERIAL NUMBER:			
TOTAL HR/LDG:	OPERATED BY		BASED AT:			
	- FINS	eriuoeranonees	VIEW PRIMEIN			
Carry out FPI of (4) carry out	· ·	, <u>*</u>	E-1417-05 and the Dart	-QSI 038 <del>,</del>		
Qty (3) P/N D212-6 Qty (1) P/N D212-6		B25649, B25650 & B2 24785	25651			
RADIOGRAPHY	ULTRASONIC	PENETRANT	MAGNETIC PARTICLE	EDDY CURRENT		
Fluorescent penetrant inspection was performed in accordance with the above requirements on (4) cross tubes.  Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive) Ardrox 970P25E Batch #04B503.  (4) cross tubes PASSED inspection.						
	EE DESGRIBED ABOVE HAS BEEN THE APPLICABLE STANDARDS (	N-PERFORMED IN AGGORDANCE WITH DE AIRWORTHINESS	date Mar	rch 10, 2006 t Required		

E EUSTOMER INFORMATION

CUSTOMER Dart Aerospace

P.O. NUMBER 00000767

ADDRESS:

CONTACT NAME:

LABOUR	@	\$
MATERIALS	@	
TRAVEL EXPENSES	@	GST
HOTEL EXPENSES	@	PST
	· · · · · · · · · · · · · · · · · · ·	

TOTAL \$ INVOICE NO.

